determined by a flow rate approximately equal to the ambient pressure with ambient at see level being 101 KPa (14.7 pounds per square inch).

The low flow rates and relatively low pressures are utilized because the system is designed to provide a supplement of a medical gas to a patient rather than forcing the gas into the lungs of the patient. The system will work to provide accurate data at elevations from slightly below sea level to above about three thousand meters (minus 200 feet mean sea level to about ten thousand feet).

As best seen in Figure 4, a switch 30 suitable for use in the gas flow alarm 20 has a flexible metallic reed 32. The flexible metallic reed 32 is connected at an end 34 to an electrical terminal 36. The electrical terminal 36 is connected to a low voltage current source. The flexible metallic reed 32 has second end 40. The second end 40 of the flexible metallic reed 32 contacts a second electrical terminal 44 to complete an electrical circuit. The flexible metallic reed 32 is sufficiently flexible enough to permit a relatively low flow (consequently low pressure) of a medical gas to displace (break) the second end 40 of the flexible metallic reed 32 away from the second electrical terminal 44 thereby interrupting the electrical circuit. The direction of the flow of the medical gas according to the present invention is shown in figure 4 by the arrow. A set screw 46 permits the switch 30 to be variably set to accommodate different sensitivities for the gas flow alarm 20. The set screw 46 impinges on the second electrical terminal 44 to place the second electrical terminal 44 in closer proximity to the second end 40 thereby making the switch 30 more sensitive to gas flow.

Suitable gas flow alarms 20 are described in United States Patent 3,133,997 to Greene issued May 19, 1964 that describes a fluid-pressure activated switch. Pressure activated switches are described in the MPL publication available at mpl@pressureswitch.com from Micro Pneumatic Logic Inc., 555 SW 12 th Avenue Pompano Beach, Florida 33069. Further disclosures of pressure activated switches are found at World Magnetics 810 Hastings Street Traverse City, Michigan 49686, telephone: 231-946-3800 and fax: 231-946-0274 and located on the web at http://www.worldmagnetics.com. The gas flow alarms described in United States Patent 3,133,997 to Greene, the MPL publication from Micro Pneumatic Logic Inc., and the World Magnetics are specifically incorporated herein by reference. As best seen in Figure 2, the gas flow alarm 20 has protruding from it a second nipple

tube 82 and the second hollow tube 84 are each separately in fluid communication with the binary opening 78.

A clip 88 is conveniently utilized to maintain the first hollow tube 82 and the second hollow tube 84 in close proximity. The clip 88 is a "C" shaped hard plastic into which the first hollow tube 82 and the second hollow tube 84 are inserted and held in place in the interior curvature of the "C" by pressure fitting. The clip 88 is with moderate effort slideably engaged on the outer surface of the first hollow tube 82 and the second hollow tube 84.

The first hollow tube 82 connects with nasal cannula 90 via a first nasal cannula fitting 92. The second hollow tube 84 with a second nasal cannula fitting 96. The first nasal cannula fitting 92 is in fluid communication with first hollow tube 82. The nasal cannula 90 is connected with a second nasal cannula fitting 96. The second nasal cannula fitting 96 is in fluid communication with second hollow tube 84.

The first nasal cannula fitting 92 and the second nasal cannula fitting 96 are a part of the hollow nasal cannula tube 90. The first nasal cannula fitting 92 and the second nasal cannula fitting 96 are both in fluid communication with the hollow nasal cannula tube 90.

The nasal cannula tube 90 has protruding from it a pair of spaced apart nasal fittings 102 and 104. The spaced apart nasal fittings 102 and 104 are in fluid communication with the hollow nasal cannula tube 90.

The spaced apart nasal fittings 102 and 104 have nasal orifices 108 and 110. The nasal orifices 108 and 110 permit the flow of a medical gas out of the nasal cannula tube 90 to the nostrils of a patient in need of the medical gas.

To avoid accidental disconnection and the resultant false alarms, it is suggested that each of the hollow flexible tubing 14 and the hollow flexible tubing 64 be from 25 centimeters to 2 meters, preferably 30 centimeters to one meter in length.

The personal gas delivery system 10 permits the hollow flexible tubing 14 to receive a medical gas, such as oxygen, from a medical gas supply source (not shown). The hollow flexible tubing 14 receives the medical gas allowing the flow of a medical gas to the hollow tubing

two flow paths at least some of the medical gas passing through one of the hollow tubes will likely reach the patient. In any other case, the alarm 20 may be fully functional and the patient would still not receive an adequate supply of the medical gas.

Thus, as an additional feature to the alarm aspect of the present invention is a transmitter 200. The transmitter 200 is shown in Figure 6. The transmitter 200, when connected with the gas flow alarm 20, transmits the fact that the flow rate of the medical gas has fallen below a predetermined point to a remote receiving location such as a nursing station. The transmitter 200 is any conventional low power device that does not interfere with the operation of the overall system. The transmitter 200 transmits a radio signal through an antenna 202.

A second embodiment of the present invention employs the feature of moisturizing a medical gas to be supplied to the patient. As best seen in Figure 5, is a medical gas supply line 210. The medical gas supply line 210 is connected with a humidifying device 220. The humidifying vessel 220 comprises a humidifying container (or moisturizing vessel) 222 and a humidifying container cap 224.

The humidifying container 222 has a screw sealing mechanism at its upper opening. The humidifying container cap 224 has a screw sealing mechanism. The humidifying container cap 224 has a screw sealing mechanism is mated to the screw sealing mechanism of the humidifying container 222. The humidifying container cap 224 has extending there through a first opening 228. The humidifying container cap 224 has extending there through a second opening 232.

A gas delivery conduit 236 extends through the first opening 228 in the humidifying container cap 224. The gas delivery conduit 236 extends into the humidifying container 222, when the humidifying container cap 224 is screwed onto the humidifying container 222, to a point just above the humidifying container lower surface 238. In practice, the gas delivery conduit 236 will be below the level of the humidifying liquid in the humidifying container 222.

A gas receiving conduit 242 extends through the second opening 232 in the humidifying container cap 224. The gas receiving conduit 242, extends into the humidifying container 222, when the humidifying container cap 224 is screwed onto the humidifying container 222, to a point just below the bottom 244 of the humidifying container cap 224. When the personal gas delivery system 10 is in operation the gas receiving conduit 242 will not extend below the level of the humidifying liquid in the humidifying container 222.

A medical gas is introduced to the delivery conduit 236 and into the humidifying container 222. The humidifying container 222 is filed to a point about 2 centimeters below its top with distilled water. The gas delivery conduit 236 is below the level of the humidifying liquid in the humidifying container 222. The medical gas from the gas delivery conduit 236 is humidified in the humidifying container 222.

The gas receiving conduit 242 takes up the humidified medical gas. The arrow in Figure 5 shows the direction of gas flow. The medical gas then passes through the gas flow alarm 20 as previously described.

A third embodiment of the invention is shown in Figure 6. In the last embodiment of he invention there is disclosed a switch 300 for the gas flow alarm 20. The gas flow alarm 20 has an anterior surface 302. Located on the anterior surface 302 is a light 304 for alerting the patient that the gas flow alarm 20 has detected a low pressure or low flow rate of the medical gas.

To allow the patient to be confident that the gas flow alarm 20 is operating properly there is an alarm test switch 306. A second switch on the anterior surface of the gas flow alarm 20 is an on off switch 310. The on off switch 310 is located on the anterior surface 302 of the gas flow alarm 20. The gas flow alarm 20, when activated will provide a continuous signal until the alarm is reset, or the alarm is inactivated, or the batteries are depleted.

Accordingly, the gas flow alarm 20 may also provide an on off switch (or a test feature) 310. Although the above description and accompanying drawings relate to a specific preferred embodiment as presently contemplated by the inventors, it will be understood that the invention in its broad aspect includes mechanical and functional equivalents of the elements described and illustrated.

Although the above description and accompanying drawings relate to a specific preferred embodiment as presently contemplated by the inventors, it will be understood that the invention in its broad aspect includes mechanical and functional equivalents of the elements described and illustrated.